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THE MAGNAVOX COMPANY, et al.,

Plaintiff,

vs.

CHICAGO DYNAMIC INDUSTRIES et al.,

Defendants

) No. 74 C 1030

) and

) 74 C 2510

Thursday, January 6, 1977

9:45 a.m. □ □ □

Parties met pursuant to adjournment.

MAR 2-1977

PRESENT:

MR. ANDERSON

MR. WILLIAMS

H. Stuart Cunningham, Clerk
United States District Court

MR. GOLDENBERG

MR. RIFKIN

THE CLERK: 74 C 1030, consolidated with
74 C 2510, Magnavox v Chicago Dynamics, case on trial.

THE COURT: Good morning, gentlemen.

MR. ANDERSON: Good morning, your Honor.

MR. GOLDENBERG: Good morning, your Honor.

CASIMIR DABROWSKI,

called as a witness by the defendants herein, having
been previously duly sworn, was examined and testified
further as follows:

CROSS-EXAMINATION (Continued)

BY MR. ANDERSON:

Q Mr. Dabrowski, as I understood your direct
testimony, you disagreed with exactly what should be
within the purple block, marked on Plaintiff's Exhibit
91-A and marked "Hitting Symbol", is that correct?

A That is correct.

Q You felt that the means for generating the
hitting symbol should not include the timer circuit 555?

A That is correct.

Q With respect to 91-A, was that the only aspect
in which you felt that what was enclosed in the purple
did not constitute the means for generating the hitting
symbol?

A No, I think the other one had things included
and various other areas excluded.

Q When you say "the other one," do you mean Exhibit 91-B?

A Yes, 91-B.

Q I will hand you Exhibit 91-B.

A Yes, 91-B is not identical to -- what is that exhibit number?

Q 91-A.

A (Continuing) -- 91-A in that respect.

Q In what respect are they not identical?

A First of all, the package labeled H-3, which is located in the center of 91-B, is not within the confines of the purple marking, and all other areas -- I can't quite see whether -- could I get that close? I can't see what really is on there.

MR. GOLDENBERG: Your Honor, may I go over there?

THE COURT: Yes, certainly.

BY THE WITNESS:

A The package labeled -- no, all right. The difference on 91-B is that H-3 is omitted from within the confines of the purple label. With the exception of that, they are identical.

BY MR. ANDERSON:

Q Do you believe that the part H-3 should have been within the purple in both drawings to complete the

means for generating the hitting symbol?

A Yes, because H-3 determines the width of the hitting symbol.

Q Then with those changes, you agree with the purple outline enclosing the means for generating the hitting symbol, is that correct, with your changes that you have just recited?

A Yes, they do generate a hitting symbol.

Q That is a first hitting symbol, of course, or the left hitting symbol, is that right?

A No, that is not right.

Q On -- I have 91-A. I'm sorry. I am referring to Plaintiff's Exhibit 91-A.

A Oh, 91-A. All right.

Again, I can't see that one, so I don't --

Yes, that is referred to as the left.

Q And that would constitute a first hitting symbol, the left?

A It would constitute the left hitting symbol. Whether it would be the first or second, it's --

Q All right. And there is a second set of components, just as there are for the left hitting symbol, for the means for generating the right hitting symbol; is that right?

A That is correct.

Q Now, you I think indicated in your direct testimony that -- and again on cross -- that the means for generating the hitting symbol in the Exhibit 91-A and the 91-B are the same, is that correct, as far as the --

A Okay. All right. The 91-A and the 91-B do provide the same means for generating the hitting symbols.

Q And that's true of the right rear paddle on Exhibit 91-B, and the second means for generating the hitting symbol would be the left rear symbol generator, is that right?

A No, that is not right.

Q Is there not a --

A There is circuitry that you do not use. As an

example, H3 is not used with the other paddles.

Q All right. But with respect to the left rear paddle in Pro Tennis, as shown in Exhibit 91-B, there is circuitry corresponding to that which you have referred to as the means for hitting the right rear paddle duplicated for providing means for generating the left rear paddle, is that correct?

A You said that the left rear --

Q Let me try again. On Plaintiff's Exhibit 91-B you have identified various components, some within the purple outline and one or two others, and said they constitute the means for generating the right rear hitting symbol; am I correct?

A That is correct.

Q Now, is there another set of components corresponding to that which is shown I believe immediately below the purple, which constitutes the same corresponding components and functions for generating the left rear paddle?

A The left rear paddle? Yes, there are.

But, no, I take that back. Let me check this. Wait a second.

Yes. Yes, you're right. Just below it.

Q All right. Now, I think you testified that the part G-1 in the Exhibit 91-B which is labeled actually "Ball Generator" is the means for generating the hit symbol; do you recall stating that?

A Yes, I do.

Q And did you say that that was not within the solid orange line that Professor Ribbens included and labeled "Movable Hit Symbol", or is it within the orange line?

A No, it's within the orange line. I don't --

that, plus -- I think I said that, plus a lot of other things that do not generate the hitting symbol are within that orange line.

Q So you believe really to find the means for generating the hit symbol in Exhibit 91-B, all you would really need is G-1, the one marked "Ball Generator"?

A No, I didn't say that.

Q Oh, well, what other components do you feel are necessary?

A You can generate the ball generator by just applying signal inputs to G-1.

Q Excuse me?

A If you apply signals to pin 5 and P-6 of G-1, which is labeled "Ball Generator", you will generate a ball.

Q Now, I would like you to again refer to Exhibit 91-A, if you will, and it was my understanding of your testimony first that with respect to the set of components at the lower right-hand -- lower left-hand corner of Exhibit 91-A, they are the means for imparting a distinct vertical motion to the ball; is that correct?

A No. I didn't say that, because, first of all, I don't know what you mean by "Distinct".

Q All right. I think you said that you didn't know what "distinct" meant.

A Right.

Q Let's use the term -- do they provide means for imparting a definable motion to the vertical motion to the ball?

A Do they? No, they do not.

Dabrowski - cross

Q Does something in the circuit?

A The one you just talked about.

Q In the whole circuit, Exhibit 91-B, what does provide means for imparting a predictable or a definable vertical motion to the ball?

A What defines that?

Q What provides that?

A What provides that? It's B3 and A3, in conjunction with the NAND Gate called E2B, provide the vertical component.

Q And they do provide a predictable vertical component, depending upon what happens in the play of the game?

A A predictable vertical component? No, not a predictable one, no.

Q Well, can't you predict that if the ball hits the paddle near the top it will go off the paddle up?

A If the ball hits on top of the paddle it will go up.

Q And if it hits near the bottom it will go down, is that correct?

A The only thing that you can predict there is that it will be going in a direction. As an example, if I am going east, that doesn't mean you can predict whether I am going to New York or Florida.

Q But you can predict that you will go east?

A Oh, yes. You can predict that I will go east.

Q So the portion that Professor Ribbens labeled as "impart distinct motion horizontal" causes the ball to reverse from east to west at the time of hitting, doesn't it?

A No. No. That isn't what causes the ball to reverse.

Q What causes the ball to reverse from east to west in Exhibit 91-A?

A The counter consisting of G7, A7, G6B and NAND Gate H6B.

Q Are you saying they should be included within Professor Ribbens' broken line?

A No, I am not saying that.

Q Or do you feel they make up the means for causing the ball to reverse from east to west?

A All I am saying is that this counter is the item that determines whether the ball is going east or west.

Q All right. Now, if you will explain for the Court the function of the three components that Professor Ribbens has labeled as the components for causing the ball to go from east to west or impart a change in the motion, and specifically, how the two inputs marked "ball right" and "Ball left" are handled in that circuit to give an output at the bottom marked "horizontal velocity"?

A Actually, the two inputs labeled "horizontal left".

MR. ANDERSON: Your Honor --

THE WITNESS: That is in the dotted square here.

MR. ANDERSON: -- it is in the small dotted square in the lower center of the drawing, and it has Ribbens' label "Impart Distinct Motion (Horizontal)", a broken line.

THE COURT: All right.

MR. ANDERSON: At the top of those components there are two inputs coming in --

THE COURT: I see.

MR. ANDERSON: -- one to pin 5 of the left-hand component, marked "Ball Left--" or "lt" and I think that means left, doesn't it, Mr.

Dabrowski?

THE WITNESS: Yes, that is correct.

MR. ANDERSON: The other input to the one on the right is marked "Ball right" and they are tied together in some way at the bottom. The output is marked "Horizontal Velocity".

THE COURT: All right.

BY MR. ANDERSON:

Q Explain the function of that.

A The function of that circuit is to actually preset the circuit that determines which direction the

ball is going to travel horizontally by changing the count to which that counter has to count. In one case it will count one more than the count necessary to keep the ball stationary, and in the other case it will count one count less to make the ball go in the opposite direction.

Do you want to know specifically --

Q No, I think that is enough.

In other words, if one of the inputs is transferred to the output, it will go left, and if the other input is transferred to the output, it will go right in the small box?

A Well, you have two outputs. I don't know which one you are talking about.

Q I was referring to the one marked "Horizontal Velocity".

A Yes, all right, the horizontal velocity, I would have to -- let's see, that is P-0, If I changed P-0 from a zero to a one-- no, it would either stand still or possibly go in one direction.

Q Is there any play in the game that is normal in Pro Tennis or Paddle Ball where the ball actually stands still on the screen?

A Where the ball stands still? Not to my knowledge.

Q Referring back again to the circuit that is marked "Impart Distinct Motion (Vertical)", I think you testified that in the operation of that circuit, if the hitting paddle hits the ball near the center of the hitting paddle, the ball may go slightly up or slightly down, depending on the position of the other paddle?

A That is correct.

Q Are you absolutely certain of that?

A In the --

Q I am referring now to Exhibit 91-A, Paddle Ball.

A Can I look at the graph here to clarify that, if I have your permission?

(There was a brief interruption, after which the following further proceedings were had herein:)

BY THE WITNESS:

A Depending on which paddle I hit -- no, wait a second. If the ball is coming in horizontally, the ball could either end up going horizontally or down.

BY MR. ANDERSON:

Q In what event?

A We are talking about depending on whether the paddle is above or below the player.

Q Is that in Pro Tennis now or in Paddle Ball?

A That is in Pro Tennis.

Q I want to know about Paddle Ball.

A Oh, in Paddle Ball, the ball will change the angle slightly in the center of the paddle. The angle will decrease slightly, either in the upward or downward direction.

Q Depending upon what, just so I know?

A Depending on whether the opponent's paddle -- well, let's see, the paddle that is not being struck is above or below the paddle that is being struck.

Q Who prepared that chart for you, Mr. Dabrowski?

A I did.. I did it myself.

Q Are you saying the two games in this respect do not play the same, the Paddle Ball and the Pro Tennis?

A That is correct, the Pro Tennis and Paddle Ball do have differences in that respect.

Q What is the difference in the circuit that produces that difference in the play of the vertical velocity?

A If you will notice this gate labeled B6A on Exhibit 91-A, that goes to the input which is labeled 7463, and it is B-- I can't read it. I think it is 4.

The output from that goes to pin 3 of that package and pin 11. Pin 3 is labeled A-3 and pin 11 is labeled B-1.

If you go to the other one, I think you will see that there is an invertor.

Q Is that the invertor C4 shown in Plaintiff's Exhibit 91-B?

A Yes, C4, that is correct.

Q That makes a difference in the way this slight increment of the opponent's paddle is used in the play of the game?

A No, it does not make a difference. The difference is always a matter of one count.

Q Just one count?

A But it makes a difference in the angle that the ball has left the paddle at upon coincidence.

THE COURT: Do I understand that Pro Tennis has a greater angle than Paddle Ball in this respect?

THE WITNESS: No, Paddle Ball, the angle is greater.

THE COURT: Paddle Ball has a greater angle.

BY MR. ANDERSON:

Q Was that a matter of choice in the selection of the particular manner in which the ball came off of the hitting paddle?

A No, it was done that way because -- I'm not quite sure because I did not design this, but I assume the problem that they had was that the ball would get stuck either in the top horizontal line or the bottom horizontal line. They did not want that condition to occur, so you

could never have a straight horizontal motion.

Q You could never have a straight horizontal motion in which of the two games?

A That is in Paddle Ball.

Q But in Pro Tennis, you could?

A You could.

Q With respect to the manner in which the signals in the game Paddle Ball, as shown in Plaintiff's Exhibit 91-A, are assembled, I think you testified yesterday that in the upper right hand corner of 91-A, in yellow, is shown the place where the video information about the various balls and paddles and symbols is sent on to the television receiver, is that correct?

A That is the way the video information leaves this board, yes.

Q In addition, that same wire, as shown in the red on Plaintiff's Exhibit 91-A, the horizontal synchronization information is being supplied to the television receiver on the same output wire, is that correct, as shown in red on the drawing?

A Yes, there is a pulse that comes out. If you want to call that horizontal, all right, it does synchronize the -- there is a pulse that you are calling horizontal synchronization that does come out on there.

Q Isn't that used to horizontally synchronize the

television receiver?

A Yes, it is.

Q That is its purpose in being there, is to horizontally synchronize the picture in the television receiver, isn't it?

A Yes, it is.

Q There is also a blue line, which may look a little green because it is on the yellow, coming out the same place marked "video". That is the line showing where the vertical sync pulses come out of the Paddle Board circuit, 91-A and go to the television receiver, is that correct?

A Yes.

Q With respect to just the video information about the game symbols, they come in on the yellow wire that extends across the center of Exhibit 91-A, am I correct?

A You are referring to what is known as net, I presume?

Q No, no; I am just referring to the line that is shown in yellow on Plaintiff's Exhibit 91-A, across the center of the exhibit, that is a line on which the pulse information, timed pulses representing the location and size of the paddle, right paddle, left paddle and the ball, are all going to the output to the television receiver, is that correct?

A This line does represent the information that

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generates the ball, the left and right paddle, that is correct.

Q They are combined together, and the information coming down the two yellow lines along the left side of Exhibit 91-A represents the information, the pulses, the timed pulses representing the left paddle and the right paddle, is that correct?

A That is correct.

Q They are fed into a little component marked F2B and into a component marked E4F and then on through a resistor marked 1K, is that correct?

A That is correct.

Q Am I correct that those components are functioning in the same way as the summer in the block diagram Exhibit 12-A to combine the timed pulses representing the left paddle, the right paddle, as well as the ball coming up on the line marked "Ball", into that component F2B?

A Since you do not have any details on how your summer is working, all I can say is these do combine those signals.

Q They do function as a summer, or an adder maybe is another term?

A Let's put it that they do combine the signals. Whether they add them, sum them, or that, that is something else.

Q Am I correct then that the components that I have just recited there along the yellow line function with the resistor marked "Sync" at the right side, with the blue and red lines, to function as another combining circuit, summer or adder or whatever you might like to call it, to put the timed pulses representing the ball, the paddle, right paddle, left paddle, the horizontal sync, the vertical sync together and send them on to the television receiver?

A The vertical and horizontal sync pulses are combined with the two paddle signals and the ball to go

out on that board.

Q At page 1532 of the record, Mr. Dabrowski, you were asked by Mr. Goldenberg:

"Q My first question, sir, with respect to the Pro Tennis game is: Does this game include a television receiver?

A It includes a modified television receiver, yes.

Q What do you mean by modified?

A Well, that is where the front end and the IF or the video detector are disabled by removing tubes associated with those circuits.

Q Is that device capable of receiving broadcast television signals?

A Not in that state, no."

Now, Mr. Dabrowski, it is true, isn't it, that if you plugged those vacuum tubes back into that receiver, it would again be capable of receiving broadcast signals?

A Yes, but then it wouldn't be a modified receiver.

Q Mr. Dabrowski, am I correct that your responsibility with respect to television games at Seeburg was primarily that of manufacturing and engineering of manufacture?

A That is correct.

Q Or production?

A That is correct.

Q And not design?

A That is correct.

Q You may not know the answers then to these questions, but am I correct that Seeburg did not design Paddle Ball?

A That I can't answer, because I don't know.

Q You don't know whether they did or not?

A I don't know whether they did or not.

Q All right. Am I correct that Pro Tennis was a photographic copy of a competitor's game and not designed by Seeburg?

A Pro Tennis was -- that is incorrect.

Q Are you familiar with the testimony of Mr. Macey in that regard?

A I do not know what Mr. Macey said.

THE COURT: Mr. Macey is who?

MR. ANDERSON: Excuse me. Mr. Macey is a deponent who appeared on behalf of Seeburg in the course of this litigation, Raymond Macey. His deposition was taken on the 22nd day of May, 1975 and he testified about the design and operation of these games.

MR. GOLDENBERG: Your Honor, I do object to this line of questioning. It is beyond the scope of the direct, and I think under the Federal Rules it is objectionable, unless the Court decides to permit it, in which case the

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witness may be examined, as I understand the Rule, as though he were Mr. Anderson's witness.

THE COURT: It doesn't sound to me -- well, just in the interests of saving time here I will let Mr. Anderson ask him, but I do agree that he makes the witness his own witness to the extent he exceeds the scope of the direct examination, except here would this witness qualify as an adverse witness under the Rules pertaining to adverse witness?

MR. GOLDENBERG: I think that's for the Court to decide.

THE COURT: Well, I am not thinking of adverse in terms of hostile. I am thinking of it in terms of -- I think probably under Section 60 of the Civil Practice Act of Illinois he would be considered a managing person. I am not familiar with the Federal Rule. Is there a Federal Rule similar to Section 60?

MR. GOLDENBERG: Your Honor, I don't believe there is.

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THE COURT: Do you know, Mr. Anderson, is there a federal rule of civil procedure similar to Section 60 of the Civil Practice Act?

MR. ANDERSON: Not to my knowledge, your Honor.

MR. GOLDENBERG: I don't believe there is.

MR. ANDERSON: I think there is not.

BY MR. ANDERSON:

Q Mr. Dabrowski, I will read from page 35 and 36 of the Macey deposition as follows:

"Q Was the Pro Tennis logic substantially identical to the logic of the competitor's game?

"A I never saw the logic diagram for that one or -- wait a minute. I must have. I don't know. No, I never saw the logic diagram for that game.

"Q How did you do your logic troubleshooting?

"A The board for that game was given to Ted Mau and he duplicated it graphically.

"Q The board from the competitor's game?

"A Yes."

Now, is that, to the best of your knowledge, correct, Mr. Dabrowski?

A I agree with that statement, but I don't agree with the one that you made when you asked me the question. You asked me if it was photographically reproduced, and that was not true.

Q I see. And what do you understand Mr. Macey meant when he said the board for that game was given to Ted Mau and he duplicated it graphically?

A Yes. He actually made a printed circuit layout of the board.

Q Mr. Dabrowski, we have obtained a copy of a page, namely page 383 from the court reporter's dictionary across the hall. It's the American Heritage Dictionary of the English language. And at page 383 that dictionary defines "distinct" as follows:

"Not identical. Individual. Discrete. Not similar. Different. Unlike."

Is that a fair -- are those terms fair characterizations of the motion, of the vertical motion of the ball after it is hit by the paddle in Pro Tennis?

A Would you repeat the definitions again?

Q Yes.

"Not identical. Individual. Discrete. Different. Unlike. Not similar."

A Would I agree with those definitions as applied to the motion of the ball?

Q Would you agree that the motion after it's hit by a paddle in Pro Tennis or in Paddle Ball is a motion which is different, not identical, individual and discrete and unlike the motion before it hits.

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redirect

A I will say that the motion before it hits the paddle is -- I mean after it hits the paddle is not like the motion before it hits the paddle. Well, again, the direction of motion is not, I will say.

MR. ANDERSON: That completes the cross-examination, your Honor.

REDIRECT EXAMINATION

BY MR. GOLDENBERG:

Q Mr. Dabrowski, directing your attention to the 555 element in the Paddle Ball and Pro Tennis games, what would happen, sir, were the supply voltage to that element dropped?

A What would happen to that element as far as its operation characteristics?

Q Yes, sir.

A Really, not too much, because this is one of the salient features of the 555, is that it can operate -- it can maintain a rather accurate timing interval over a very large swing of operating voltage.

Q Do you have any figure in mind as to what percentage of variation?

A Well, let's assume if you were to drop the voltage 15 percent or so, the effect on the accuracy of the circuit would be less than one percent or so.

Now, these are approximations. I don't have the exact figures, but --

Q All right, sir. With respect to the circuits of the type shown in the '507 and '598 patents, what would happen were the supply voltage in those circuits to drop 15 percent?

A I would say that they would vary more than -- considerably more than 1 percent, insofar as their variation on their outputs.

Q Do you have any belief as to whether or not a player of the game would see any visible result on the screen?

A Yes. Well, to begin with, the stationary paddle -- well, if the paddle was stationary it would move by itself. And actually, the location of the paddle with respect to the sync pulses would change in position, too.

Q Do you know whether or not the -- any of the Odyssey games are powered from batteries?

A That's only -- I have never seen an Odyssey game, but the only thing I can say is that I have heard that they do operate from batteries.

Q Do batteries suffer from a voltage drop after a period of use?

A Very much so.

MR. GOLDENBERG: We have no further questions.

RE CROSS-EXAMINATION

BY MR. ANDERSON:

Q Just a couple of questions, Mr. Dabrowski.

You have in front of you the circuit diagram of --

A Paddle Ball.

Q I place before you the circuit diagram of Pro Tennis. And am I correct that the circuit in the

center on the right side of Plaintiff's Exhibit 91-B is a voltage-regulated power supply?

A That is correct.

Q And what is a voltage-regulated power supply?

A It keeps the voltage constantly -- relatively constant to the circuits that are used in conjunction with that power supply.

Q And if the voltage did drop, say to 15 per cent that Mr. Goldenberg asked you, at the input where Pro Tennis is plugged into the wall, what would be the effect on the output of the regulated power supply that is used with the game?

A On this game, none. The voltage would stay the same.

Q It would stay the same?

A Right.

Q It wouldn't change at all.

I did fail to ask you, Mr. Dabrowski, you were asked several questions on direct about the serving of the ball. Will you point out in Plaintiff's Exhibit 91-A --

MR. GOLDENBERG: Your Honor, this is not proper recross.

THE COURT: Do you want to reopen the cross-examination?

MR. ANDERSON: I just want to have him locate the means for serving the ball in Paddle Ball.

THE COURT: All right. I will allow him to reopen the cross-examination.

BY MR. ANDERSON:

Q All right. Would you just point out where the means for serving the ball is?

A The means for serving the ball is labeled F-4, and it's a -- well, actually -- well, the means for serving the ball, again -- I was going to say that is, but that is not necessarily so. That determines when the ball is going to be served, but it's not necessarily the means for serving it.

Q So the part marked "Serve Delay 555" is a part of the means by which the ball is served, is that correct?

A It determines when the ball is going to be served.

Q And is the actual initiation of the timing of the serve controlled by the part E-6A and E-6B to the right of the 555 in the center of Exhibit 91-A?

A When the ball will be served? No, that's determined by other components.

Q Well, doesn't that start the time delay for serving the ball?

A That resets the timer.

Q Resets the timer?

A Right.

Q And when the timer runs out, doesn't that cause a ball to be served?

A When the timer runs out, no. Not immediately, no.

Q All right. What happens after that, before the ball actually is served?

A Well, what happens is that there is a little package --

Well, can I have that?

Q Sure.

(Document tendered to the witness.)

A There is a little package labeled B5B, which is a 7474 type D flip-flop, and what all that does is it unlocks that package so it can start receiving clock pulse from the paddles.

Q And does that cause the ball to start to move?

A The thing that causes the ball to start to move is when the output on that package enables the NAND Gate labeled E1B to remove the reset from the horizontal counter.

Then, after a count of 508, the ball will appear.

MR. ANDERSON: No further cross.

MR. GOLDENBERG: We have no further questions.

THE COURT: All right. You may stand down.

(Witness excused.)

THE COURT: Gentlemen, about a minute after you left yesterday, we got a call from the attorneys for one side in the case that was to start on Monday requesting a continuance until Tuesday, and that actually worked in so well with our plans that that's what I did. And so I had my secretary call your office immediately, so we will be able to go on Monday.

MR. ANDERSON: We received that message, your Honor.

I am scheduled to go to New York Tuesday night, and I hope that we will --

THE COURT: There will be --

MR. ANDERSON: I mean Monday night.

THE COURT: There will be no problem, because I am scheduled to start a case on Tuesday morning. What time will you leave?

MR. ANDERSON: Your Honor, I can leave as late as necessary to finish the case.

MR. GOLDENBERG: Your Honor, while we are discussing this kind of thing, I do have this matter in Cleveland tomorrow which I mentioned, and I have scheduled a fairly late airplane to Cleveland tonight. If we are making progress today, and I trust the Court will perceive that is somewhat the case, anyway, could we adjourn at 4:30?

THE COURT: We will adjourn at 4:30 today regardless of what we are doing, because it looks to me like we are going to finish Monday.

MR. GOLDENBERG: I believe we will, your Honor.

THE COURT: All right.

MR. GOLDENBERG: Your Honor, at this time I would like to offer certain exhibits.

Defendants' Exhibit 2 is the file wrapper of the original application for the '480 patent. That is the record of proceedings in the Patent Office. And I will hand all these up to you.

THE COURT: All right.

MR. GOLDENBERG: Defendants' Exhibit 10 is a binder of documents pertaining to the game "Space War" about which

the Court has heard. It consists of the portions of depositions of three gentlemen who played the game Space War, and the essential portions of those depositions are really a description of the game and how it was played.

THE COURT: Was Space War another one of these laboratory type games?

MR. GOLDENBERG: It was a computer game, your Honor.

THE COURT: It seems to me I have heard the name in some commercial connection, but I may be wrong.

MR. GOLDENBERG: I can't say that. I have no knowledge myself. Whether or not this record will show it --

THE COURT: And I could be entirely wrong. It's just the name "Space War" seems not to be new to me, but I don't know

MR. GOLDENBERG: My understanding --

THE COURT: You are not aware that the thing was ever marketed, are you?

MR. ANDERSON: I believe it was not marketed, your Honor.

THE COURT: Not marketed.

MR. ANDERSON: It was played on -- apparently it was used on a computer called a PDP -- and at least in the period of interest -- which was a laboratory type computer.

MR. GOLDENBERG: Your Honor, the game Space War as played with a computer was not marketed. There was a

game called "Computer Space" which was marketed on the West Coast by Nutting Associates. And you may recall that name in connection with the deposition or portion of the deposition of Mr. Bushnell.

THE COURT: No, I think what I have in mind is some game that would be similar to something that one of the game companies would put out, like Monopoly or something like that.

MR. GOLDENBERG: A board game.

THE COURT: No, an electronic type game is what I thought of it. Apparently I am wrong.

MR. GOLDENBERG: Well, the binder, as I say, includes the portions of the depositions which describe the game, and also two copies of articles which are admitted, publications which describe somewhat the playing of the game and tell something about it.

MR. ANDERSON: Your Honor, we object to pages 40 through 45 of the Steven Russell deposition. They relate to something other than this demonstration called "Space War".

And we object to the two publications, not as publications, but as hearsay for anything that they set forth.

THE COURT: Well --

MR. GOLDENBERG: Let me say this, your Honor. The publications are both more than one year before the filing date of the applications for the patents in suit, and they are admitted publications.

Now, as printed publications they are prior art for whatever they show.

THE COURT: Yes. I don't think that the hearsay rule bars their admission for that purpose.

MR. GOLDENBERG: I have never heard this objection before with respect to a printed publication.

MR. ANDERSON: Well, any statements in those publications about something that happened cannot be evidence that it happened, for what is described.

THE COURT: I would agree with that. But it is evidence that it was said.

MR. ANDERSON: Yes, and what is contained in the words of the document, as far as a description.

THE COURT: I would not accept the document as proof of the facts recited in it. But I would accept it as proof of public knowledge of the fact that these things were said.

MR. GOLDENBERG: That's all they are being offered for, your Honor. There were stipulations between the parties with respect to what actually happened, your Honor.

THE COURT: What actually happened.

MR. GOLDENBERG: The principle purpose of this particular exhibit is to provide the Court with evidence of what it was, what the game was. There is no dispute between the parties, as a result of the stipulation, that this game, Space War, was played in at least these two universities in the United States more than one year before these patent applications were filed.

MR. ANDERSON: Your Honor, again I would question what some author said about what he heard, or something of that sort. It could not be evidence of what the structure was.

The document as a prior publication is only a prior publication for what it actually discloses of equipment on its face.

THE COURT: Of course, if you carry that objection far enough, I guess you can say the same thing about prior patents. They come in under a public document exception to the hearsay rule.

But forgetting that for the moment, everything they say about what the inventor invented would be hearsay, wouldn't it?

MR. ANDERSON: Yes, your Honor. That's absolutely true. They stand as a publication, and they must stand on their own two feet. And what is disclosed in them is disclosed as a publication.

But the existence of that patent is no evidence that the inventor ever built anything or did anything except write a patent application, and the patent itself is only evidence of what is described and disclosed and fairly --

THE COURT: Well, this is analogous to how I am receiving this evidence here. I am receiving it as evidence that these things were said. And if the publication of those statements is relevant, then it's admissible for that purpose.

MR. GOLDENBERG: I would also like to offer Defendants' Exhibit 11, which was --

THE COURT: I might say that on the question of public knowledge, let's assume that someone had

published a completely spurious account of some invention, and it appeared in Look Magazine six weeks running, had been read by millions of people, and then ten years later someone purports to invent that very thing that was described. Would that publication bear upon the novelty of obviousness of the invention?

MR. ANDERSON: Only for what it fully and fairly described, your Honor. And if I can cite -- just try to find a case in point -- if the publication were put in evidence that said the 1971 Impala Chevrolet was introduced in the marketplace today and the issue was whether or not it has a particular kind of a tail light in it, that could be absolutely no evidence that it had a tail light in it at all, let alone a tail light of a particular kind, and it couldn't support any argument that that Chevrolet had certain characteristics, because it only proved what it says and it only is evidence as to what is fully and fairly disclosed.

If it said they came in ten colors, that might be a disclosure that you can make Chevrolets in ten colors. But it wouldn't prove that it was done, or it wouldn't prove what kind of paint it was, or anything of that sort. It wouldn't even be evidence of it. It only, as a publication, as I understand it,

under 102 of the Patent Act Title 35, it can only be evidence of what it fully and fairly describes within the context of the four corners of the documents.

THE COURT: Well, I understand. But are we talking about anything more than a document?

Let's say that it is like the man we have all read about recently, the English psychologist who apparently is now alleged to have fabricated a number of experiments having to do with learning in children. He published all this data and apparently, according to one view, it was spurious data. I suppose you could have the same thing in the technological field. Someone could publish an article describing in great detail some machine and claiming that he built it, and maybe he never really did build it. He never got around to actually building it. There it is laid out in black and white with diagrams and charts and everything, but the article is an absolute lie in the sense that the man just never got around to actually reducing it to practice.

Now, if someone comes along ten years later and seeks a patent on that very machine, because he has now built it, would he be entitled to claim novelty?

MR. ANDERSON: Not if it is spelled out in black and white as the Court said.

THE COURT: All right, that is what we are talking about here.

MR. ANDERSON: But if it just said he built a space ship to the moon, or he conceived a model --

THE COURT: No, I am assuming that this material about Space War is fairly specific, isn't it?

MR. ANDERSON: Your Honor, I think you have put your finger right on the reason why we raised the objection. It is not very specific, and we want to limit the publication--

THE COURT: To the extent it is not specific, it is not relevant.

MR. GOLDENBERG: That, it seems to me, to be my problem to argue to your Honor that it does disclose something that the Court should know about.

Defendants' Exhibit 12 is a collection of various responses by the plaintiffs to interrogatories and requests for admissions submitted by the defendants in this case. At this time I think the only one I would call the Court's attention to is the one under Tab 3.

THE COURT: I won't read any others if that is the only one.

MR. GOLDENBERG: Correct, your Honor.

THE COURT: Do you want me to read it now?

MR. GOLDENBERG: Yes, sir.

(There was a brief interruption, after which the following proceedings were had herein:)

MR. GOLDENBERG: In answering this interrogatory, the plaintiffs set forth the dates of invention for the patents in suit and, with respect to the '480 patent, stated that the date of invention for that patent was September 1, 1966; for the '284 patent it was October 12, 1967; and for the '285 patent, it was November 30, 1967, thus making the subject matter of the '480 the prior art with respect to the other two under the provisions of Section 102(g) statute, and the subject matter of the '284 prior art with respect to the '285 under the same section of the statute.

MR. ANDERSON: Your Honor, I disagree with the legal conclusion. I think probably we best save that for the oral argument.

I do not believe that these statements make the entire disclosures of any of those patents prior art as to one another. It depends on the proof of what was done on those dates. We have had evidence of what was actually done in the entire period from September of '66 on.

THE COURT: And you claim that less was done than shows in the '480 patent?

MR. ANDERSON: Your Honor, I think Mr. Baer testified that he conceived of the very first work in this area around

September 1, 1966, that there was a long train of work after that which the totality of the '480 patent was developed more or less -- I don't like the word piecemeal -- but it developed. There is testimony about when various parts were done, and I think in its totality Baer testified that the '480 patent accumulated the disclosures that he had developed both prior to June of '67, when he gave the demonstration to Mr. Etlinger, and after that date. I think the record will have to speak for itself on that.

MR. GOLDENBERG: Your Honor, I won't take up any more of the Court's time --

THE COURT: All right, perhaps that is a matter for argument at the end of the case.

MR. GOLDENBERG: At this time we would like to call Mr. Arthur Holt to the stand, your Honor.

(Witness sworn.)

ARTHUR W. HOLT,

called as a witness by the defendants herein, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. GOLDENBERG:

Q Mr. Holt, could you state your full name and residence address, please?

A Yes, my name is Arthur W. Holt, H-o-l-t, and my residence is at 20 Wardour Drive, in Annapolis, Maryland, 21401.

Q Mr. Holt, could you, beginning with your graduation from high school, state your education beyond that, indicating the institutions attended, degrees received, if any, and what years those degrees were received?

A Yes, in the fall of 1939 I entered Williams College, which is a little liberal arts college in the western part of Massachusetts, and majored in physics.

I didn't major right away, but I was intending to. I did graduate four years later, a little less than four years later. We speeded up on account of the war.

I graduated in January, 1943. At that time I was immediately commissioned and went to more school.

I guess I ought to say that I took some extra courses from Rensselaer, in addition to my regular college courses. Then upon graduating with a Bachelor's degree in physics, I then immediately went into the Army as a second lieutenant and went to Harvard and MIT Radar Schools, which became rather famous.

During that period of three years that I was in the Army, I did get very well acquainted with

one facet of the kinds of things we are dealing with in this trial, which is radar display devices and PPI's, planned position indicators, which are mentioned at least in some of the prior art.

So I got quite familiar with a lot of circuits that were new at that time and displays which have some bearing in the trial.

In 1946, upon getting out of the Army, I went back to Williams College, and they offered to -- I was the first fellow in the history of Williams College to be offered a Master's degree, and the reason was they needed instructors.

So for two and a half years I instructed half time and took a Master's degree course, again got my Master's degree in physics.

Interestingly enough again for this trial, it so happens that my thesis involved cathode ray tubes in a very intimate fashion. I invented a method for storing digital data on the face of a cathode ray tube. It used the fact that -- and this is really kind of unusual -- the front of the cathode ray tube is phosphor. When you hit it with electrons, it gives off light. If you come along and the phosphor has not been hit recently, with a certain bang you get a big lot of light out of it. You look at it with a photocell. If

you come along soon after that time and hit the same spot, you only get a little light out of it because the material of the phosphor has been sort of used up temporarily and it has to sort of regain its ability to give out light.

So you can make a memory, and we danced around the face of the cathode ray tube. We didn't apply for a patent because we could only store 10 or 11 spots then and it just wasn't worth it; but they did give me the Master's degree and encouraged me to go on to Harvard.

I went to Harvard in the fall semester -- that would be '48 and '49 -- in the Department of Engineering Sciences and Applied Physics. I think Dr. Ronald W. P. King did me in there. But in any case, I found myself with two kids at the end of that time and decided to take a job at the National Bureau of Standards.

During the next three or four years I did make some sporadic attempts to go further on for a Ph.D. but those kind of petered out because I was doing such interesting work, really.

Q All right, sir, commencing with your employment at the Bureau of Standards -- in 1949?

A Yes, it would be August of 1949.

Q (Continuing) -- could you recite in a chronological fashion your professional career and tell the kinds of things that you worked on, not in any great detail but in some manner so the Court may have some appreciation.

A I suddenly found myself in the middle of one of the most exciting things that could happen to somebody in my profession, namely, the birth of the computer business.

We at the Bureau of Standards were building a computer. At the time I arrived the design was fairly well along, but we were building what became SEAC. This machine was the first of what is now known as a stored program computer. It was the first operational one in this country. There was one at Manchester, England that was operational a little bit ahead of us, but the important difference here -- and this was really the beginning of modern computers -- was that the machine could change its own instructions on the basis of an earlier computation, and that is rather a big jump.

Memory was a terrible problem in those days. The logic of steering things around, the arithmetic units, worked fairly well, but memory was a real problem. SEAC was designed with what is called an acoustic delay line memory, which worked pretty well,

but they wanted a faster memory.

So they set me to work helping to build what was called the Williams tube memory, an electrostatic memory.

When Mr. Brown was at MIDSAC, they were using the same kind of electrostatic memory, not too satisfactory in its early days.

I was asked to go in and try to make this memory a lot more reliable. One of the things I did, I got a patent on one thing which did make it more reliable. It turns out that in the way -- and this is not the thing I did my thesis on, but it is awfully closely related -- in the Williams tube memory, you store electrons, charges, on the inside face of the tube. Then later you come along and probe it with a beam to find out if it is there.

Here comes a trick. You paste a piece of metal -- we used to take little grid, like flash water material or window screen material -- paste it on the front of the cathode ray tube and hook it to a very high gain ethyl fire. If a particular kind of charge was there, you would get one kind of signal out, and if the charge was not there, you would get a different kind of signal out.

So I managed to improve that considerably.

Then after that, I began to worry about building more reliable memories. It still wasn't really reliable enough because if you had a lurch in those days in the voltages, for example, or if you had lightening striking nearby, our amplifiers would pick that up and give the memory a very hard time.

So do you have --

Q Could you go on, sir? How long were you at the Bureau of Standards?

A I was at the Bureau of Standards until 1955.

Q Did the SEAC computer ever become operational?

A The SEAC computer did indeed become operational and was what they called dedicated in May of 1950.

At that time it was running major work, particularly for Los Alamos in inverting 100 by 100 equations for the hydrogen bomb work. It was running around the clock. The standard charge to other government agencies was \$100 an hour on that.

Q I believe you were in Court when Mr. Brown testified that the MIDSAC computer did not become used for its intended purpose and that one of the reasons for that was the problems of failure in the electrostatic memory tubes.

Is that your recollection, sir?

A Yes.

Q Do you have any explanation as to why those tubes worked in the SEAC computer and why they did not work in Mr. Brown's MIDSAC computer?

MR. ANDERSON: Your Honor, I object to the question. It is irrelevant and lacking in foundation.

THE COURT: On the foundation part, do you think that the witness heard enough from the testimony of Mr. Brown to know what was in the MIDSAC?

MR. GOLDENBERG: Let me ask this of the witness, if I may, your Honor.

BY MR. GOLDENBERG:

Q Did you have any occasion to study or to consider the description of the MIDSAC computer, which has appeared as one of the exhibits in the trial in this case?

A Yes, and not only that, your Honor, but MIDSAC was a direct descendent of SEAC. It was a copy in the logic, and we had a lot of going back and forth on the logic of this thing.

They used our electronics, except didn't use our Williams tube system.

THE COURT: All right, I will overrule the objection.

BY THE WITNESS:

A I have direct knowledge of this. I wish that we had had a little more communication on the electrostatic storage. They copied the rest of our circuit, but that they didn't copy, so we definitely could have helped more there.

However, the MIDSAC had a different mission than SEAC. SEAC was intended to do scientific calculations on not a real time basis. I think perhaps you talked about real time yesterday.

It didn't matter if you had to wait 5 minutes or 10 minutes to reload memory if you are doing a problem which

was going to run a week anyway, but if you are trying to land an airplane with no visibility and it is full of bombs and people, you can't really say, "Oh, sorry, I have to reload memory. Wait up there."

So I think that if he had had less severe -- well, the pool game that they did was an example of a less severe problem and they got through fine. The memory worked fine for those apparently.

BY MR. GOLDENBERG:

Q Did you have any other projects at the Bureau of Standards before you left it beyond your work on the SEAC computer?

A Yes, a couple of interesting ones. The memory problems we had kept bothering me, and I did invent a gadget called a diode capacitor memory, and this time it was good. A big one was built for the third version of SEAC, Tri-SEAC, and they made a fuss about it and gave me a little silver medal.

While I was doing that, I noticed that the diodes that I had available in those times, in particular what we mostly had in the way of diodes that would be really good for this memory, had a very peculiar characteristic that a diode basically conducts current in one direction and not in the other; very useful; but I noticed that after I had pushed current in one direction, it took quite a long time,

like a millionth of a second, when I turned it and tried to make it not shut off. In other words, I reversed the voltage and the current would go in another direction at 100 times the voltage sometimes.

I kept waking up in the middle of the night, and I suddenly realized that we had an amplifier here. This was really an unexpected result because in 1952, this was, to discover that a diode, a two-terminal device, actually could amplify was kind of exciting.

I got a couple of patents on the basis of that and some circuits and computer circuits on that kind of thing.

Q After you left the Bureau of Standards, what was your next employment?

A I was asked to join the company of Jacob Rabinow, and this was quite an honor because he was already a highly regarded scientist. He had started what was going to be a consulting company and grew a good deal bigger than that.

I came on board in May of 1955 as chief electronic engineer.

Q What was the business of Mr. Rabinow's company at that time, sir?

A Initially a lot of it would be called automation, if your Honor is familiar with the expression, having to do with applying high technology and computer stuff to industrial processes and programs, was certainly one of them.

Another thing, which is part of it really, was automation for the United States Post Office. One of the early things we did was to design what is now called The Letter Sorting Machine, or LSM, which is to this day practically the only piece of hardware, what they try to call high technology hardware. It was just a bunch of carts which transported letters, but there was some fairly nice electronics which went with it, which I did.

We did practically anything somebody came in with a big idea about that he wanted to do but he didn't know how to do it. They would come to Jack Rabinow.

One day an inventor with a good record, called Jim Fay, came along. Jim Fay was already a well-recognized inventor. This was the time when television was now seven or eight years, this being 1958, and everybody wanted to -- it was a terrible

waste. Here you spent \$50,000 producing a program and it went out over the air and maybe made money, but you couldn't ever see it again, except for very poor --

MR. ANDERSON: Your Honor, if I may, I would just object on the grounds of relevance.

THE COURT: Well, it goes to the witness' background and expertise. I will overrule it.

MR. GOLDENBERG: That is the sole purpose of the offer, your Honor.

THE COURT: Overruled.

BY THE WITNESS:

A Television up to that time had no good way of being recorded except on movie film, which was a pretty poor way of doing it.

AMPEX did have a system recording on magnetic tape, which was very poor. It used four heads on it, and you could see three lines in the middle of things, places where the picture broke up. So you could always tell when you were watching it on that type of recording.

Jim Fay said, "Let's not have any kind of that nonsense," and he produced a Mylar stock, which was a mile long. It was circular. It was a mile long and rolled up on a reel.

He came to Jack Rabinow and said, "All

"you have to build for me is a fish which swims inside this and then a ring out here with a head which goes around this thing and the tape then goes up slowly and that would make a perfect television recording."

This was a nightmare. I was supposed to do the electronics for it, and I couldn't do it because the tape did not come through this monster well.

So finally I woke up one morning again -- it always seems to happen when you are shaving -- and invented what is now called the helical.

Have you ever heard of what is called a video tape recorder? They are in all the schools. Media centers use a lot of them. You may have heard of Beta Max being advertised. It is now going to be a home recorder.

Basically it is a way of taking flat tape and wrapping it around a cylinder. The cylinder spins, but there is none of this progression from a round to a flat. It is an allowable method.

So it is a helical wrap around a head which is spinning, and there is only one head in my initial invention.

This was kind of a change to the state of that art.

BY MR. GOLDENBERG:

Q All right, sir, how long were you with Rabinow Engineering?

A I was with Rabinow from 1955 until 1969. He did sell his company to Control Data in late '64. I stayed on.

Q Did you while at Rabinow Engineering become active in any other field of electronic technology?

A Our major work became, after a few years of indecision, involved in optical character recognition. That is a method of putting data in a computer. A computer is no good unless some data gets put into it. It just doesn't munch in silence. I mean, you have to put some data in.

Normally if you wanted to put a page of data in, the old way was to sit down at a keypunch and produce IBM cards with holes punched out, or you could produce paper tape, punch holes in paper tape, or you could just sit down at a keyboard and type it in directly. But it is very burdensome when you want to put a lot of data in the computers.

Jack Rabinow and our company specialized in building machines which would read typewriting and printing and even handprinted also and numbers and automatically translated them into computer language for entry in the computer.

This was our major work, and it is the reason that Control Data bought the company.

Q After you were with what became a part of Control Data, what did you do, sir, and when did you do it?

THE COURT: That sounds like something I have heard before: What did he know and when did he know it?

BY THE WITNESS:

A You have to realize, your Honor, that all of my

career has almost all been fun work.

To get back to that, the first thing we really did for them was to build a commercial page reader of this type. Up to this time we had just built one of a kind for various single customers, but Control Data then wanted to move a lot of them, so we worked pretty hard building the 915 page reader, optical character page reader, which became the standard of the industry. I guess eventually 300 of those were sold.

Again, a number of my patents are in that machine and the blood of Jack Rabinow lubricated the bearings of that and some of my blood, too.

We designed a whole family of machines, including machines to read handprinting. We used a lot of things which are relevant to this trial while we were doing that.

We were, of course, continuously using oscilloscopes. Cathode ray tube is the integral part, the important part of an instrument which we call an oscilloscope, and it is used in laboratories.

Characteristically we would say, "I want to look and see what this stuff is that the scanner has picked up." After the photocells have done their work, we would like to see what they picked up, just every so often to check up and see if our photocells were working or what had gone wrong.

We would put the information in registers, and then we would want to display it. One of the obvious things to do is to hook up your cathode ray tube as a raster scan. Normally on an oscilloscope --

MR. ANDERSON: Your Honor, again I would like to object. I don't know if this is being put forward as prior art. If it is, it is a totally new thought to us. If it isn't, I think it is irrelevant and it is improper examination.

THE COURT: Well, it does sound like now we are getting into the prior art rather than the background of the witness.

MR. GOLDENBERG: No, your Honor, I don't believe we are.

THE COURT: All right, at this point I think I have heard enough to know that this witness is certainly an expert on those matters to which he has testified so far. So why don't we get on to the substance of his testimony?

MR. GOLDENBERG: All right, your Honor.

I would say if not at this point but perhaps at some other point, I would be proposing to offer the Court witness of this character because we do think it is entitled to have evidence about the level of skill in the art, as distinguished from any particular prior

art item per se.

MR. ANDERSON: Your Honor, the state of the art at the time the invention was made is generally the language used in 35 USC 103. I believe under 35 USC 282 we were entitled to notice about anything that the defendants intended to rely upon as the state of the art in establishing what was unobvious at the time the invention was made.

MR. GOLDENBERG: Your Honor, I think we are talking about two different things.

Are you looking at 282?

MR. ANDERSON: I have 282.

MR. GOLDENBERG: What we are required to give them notice about, your Honor, according to the language of the statute is "identification of patents and publications which are to be relied upon as anticipation of the patent in suit or, except in actions in the United States Court of Claims, as showing the state of the art."

The testimony we are offering in this respect is not to show the state of the art but is to show the level of skill in the art. I have in mind the so-called three factual inquiries of Graham versus John Deere, in which the courts are instructed, among other things, to make findings or make a factual inquiry with respect to the level of skill in the art. It seems to be it

Holt - direct

is appropriate -- and we will get into this not in any great detail, I assure the Court -- but who are the people that practice in the art with which this lawsuit is concerned and what is their level of skill?

MR. ANDERSON: Your Honor, I very strongly object to any new injections of new items of prior art to establish the state of the art at this time in this trial. The three tests that are set forth in Graham v Deere are, one, what the contribution of the invention was; two, what the state of the art was as that term is used in 102 and 103 and 282; and then from those you conclude the differences. The third is not some further prior art or state of the art to be established by testimony. It is to be concluded based upon the two first inquiries.

I think we are entitled to have had the statutory notice of any items of prior art on which the defendants intended to rely, and I think it would be grossly improper to inject at this time anything else.

THE COURT: May I see the actual language of that 285?

MR. GOLDENBERG: Yes, sir.

(There was a brief interruption, after which the following further proceedings were had herein:)

THE COURT: I am trying to decide whether there is a difference between the state of the art

and the skill of the persons who practiced the art. I suppose they are different things.

Certainly grammatically they are different things.

I suppose in order to know what would be obvious to one of ordinary skill in the art, it should be proper to inquire as to what that level of ordinary skill was. I think, Mr. Anderson, that you are saying that one is limited to inferring that level from the state of the art itself. You look at the art and you say, "Well, okay, people who practice it were of a level of skill sufficient to turn out that work."

Is that your point?

MR. ANDERSON: Your Honor, yes, my point is that 103 states that, "A patent may not be obtained though the invention is not identically disclosed as described, as set forth in Section 102 of this title, if the differences between the subject matter sought to be patented and the prior art --" and those are the two tests that Graham v Deere establishes -- "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."

If the defendant wishes to put in some evidence about whether that man of ordinary skill would be a technical worker, a college student, a professional engineer, I would have no objection to that; but I think to put any evidence about the technology that existed at that time is going to the state of the art, not the man of ordinary skill in the art and deciding who he is.

Certainly this witness is anything but a man of ordinary skill in the art. He holds many patents. He has described eloquently his rather substantial and impressive inventions over his career. I think it would be unfair to let him characterize by his own testimony what the state of the art is or what the ordinary man in the art would be able to do.

THE COURT: Go ahead, Mr. Goldenberg. You may reply to Mr. Anderson.

MR. GOLDENBERG: Your Honor, we would, of course, not contend that Mr. Holt is a person of ordinary skill in the art. We don't think he is, but we do think --

THE COURT: I am sorry. Now I have lost the place of the original section. What was that

original section?

MR. ANDERSON: 282, your Honor.

MR. GOLDENBERG: 282.

THE COURT: All right, go ahead.

MR. GOLDENBERG: We don't think he is, but we do think as a result of his long experience that he is entitled to give testimony about the level of skill, and going beyond the narrow limits that Mr. Anderson would impose, namely, perhaps a description of what such a fellow might look like or qualities that he might have, to tell the Court some of the things those people were doing, were capable of doing at the time the work for these patents was done and prior to that time.

I don't intend to prolong that, your Honor, but I think it would be helpful to the Court to establish or have evidence which shows the level of skill --

THE COURT: What did you list in your 282 notice in regard to computer technology? Did you limit it to the three computer games or did you specify the broad field of computer --

MR. GOLDENBERG: No, your Honor, I limited it to the three computer games.

THE COURT: I think in fairness I should limit then this testimony of this witness to what he believes was implied and obvious from the things that you did specify in the nature of computer technology, namely, the Michigan game, the RCA game, and the Space War.

Now, there may be many things that one who was aware of those games would also be aware of that will tend to make your point, but I don't think that I am going to let him go up to 1967 and talk about some specific things that were being done by computers at that time because to comply with Section 282, I think that would be more the state of the art than the skill of the art and it should have been disclosed.

MR. GOLDENBERG: All right, your Honor, we will comply with the Court's ruling in that respect.

THE COURT: I will hand you back your book. I ought to have one of those pamphlets myself.

MR. GOLDENBERG: They are very handy.

BY MR. GOLDENBERG:

Q Sir, can you just briefly complete describing your professional experience since Control Data?

A Yes, in 1969 I and four other of the staff members of Rabinow Laboratory of Control Data left Control Data to form a company called Recognition Terminals, Inc. This was strictly an optical character recognition company and we were just going to try to go it alone. We had been bank-rolled by Recognition Equipment, Inc. I was vice president for research, and we did build a very small optical character reading machine with handprint capability, which sold for a very, very low price in those days of \$22,000 complete.

However, only 14 models of it were built and sold, 14 copies of that.

Q Yes, sir. Could you complete this portion of this testimony just in a chronological fashion, sir?

A All right. I was then employed as a consultant by Recognition Equipment for a year.

Then opened my own company as a consultant, Arthur Holt, Incorporated, in 1972.

And occasionally I have had other people working for me, but mostly I am the only employee.

I have had at least two projects where I have done a lot of television work during the period of 1972 until now.

Q All right, sir. Have you ever testified in any other patent cases?

A Yes, I have.

Q Have you studied these patents in suit here, that is, the '507 and the '598 patents?

A Yes, I have.

Q Have you made any study of the defendants' games?

A Yes. I have made a study of the defendants' games. It is not as good as Mr. Dabrowski's, but I have made a study.

Q Do you find any differences between the defendants' game and the disclosures of the patent in suit?

A Yes, I do.

Q Could you state what those differences are, as you see them?

A The major difference is ball bounce, and the Court has heard a lot of testimony on this. The ball bounce of the defendants' game is really, from an observer's point of view, it looks as if you couldn't really predict what was going to happen next.

Now, we know that it is digital circuitry, so that given exactly the identical conditions, that it will do the same thing. But the defendants' game has three sections to the paddle and a different thing happens if the ball hits the top section than if it hits in the middle section, middle of the paddle, or if it hits in the bottom of the paddle.

And the motion of the ball, furthermore, on any one of those sections is furthermore influenced by the position of the opposing paddle on any section of the paddle that the ball may hit.

The position of the opposing paddle is also important and does affect this.

This kind of motion is not described in

any of the specifications of the '507 and '598 patents.

Q Well, do you have any views, sir, as to whether or not that the means, the operation of those means, and the results of the operation of those means, are the same or substantially the same in the games of the defendant, as those shown in the patents in suit, the '507 and the '598 patents?

A Could I take those one at a time? I would like to take the means, first, and then the operation, and then the results.

Q Yes.

A The means are certainly not identical, nor are they substantially identical. In one case, the specification of the '507 and '598 patents show analog circuits.

Your Honor, I wonder if I could try again to give my own description of the difference between analog and digital?

THE COURT: Sure. I need all the help I can get.

BY THE WITNESS:

A (Continuing) Well, this doesn't use electronics at all, but when I was a kid my grandfather had a place up in Wisconsin, where we used to go up in the summer, and all the children and grandfather used to get lined

up against the wall and they put a book up on top of their head and they put a pencil line on it and the guy's name and then the date.

And years and years went by and people grew up and had more children. And the trouble was that this house started to grow up and spread and the boards started to warp and the whole side of the house started to fall down. So we had what was a nice romantic record, except that it wouldn't stay that way, the height of this line on the wall above the floor.

And if instead of that he had taken a tape measure, let's say he took a string here and said, "Okay. That's how high this guy is." That's an analog measurement. The length of this string on the wall, that's an analog measurement.

If you put marks on the string and then count the marks, then that's a digital.

Anyhow, the '598 and the '507 patents use almost exclusively analog circuitry. That is to say, you are measuring how big a hunk of electricity is. This is not how many pulses of electricity.

And a very good way, another good way to see whether the circuitry they are using is analog or digital is to see whether the height of all the voltage pulses are the same. They are either not there or they are to a standard height. That's another good method.

The means is absolutely not identical, and not substantially identical. The defendants' games have been shown to be almost a hundred per cent digital. And not only that, they are in integrated circuit form, which is, you know, another dimension removed.

As for the operation of the game, the operations of the game are different. They are showing some differences that are obvious to everybody when

he plays them.

The early Odyssey game, ITL 200, was quite a crude presentation. Things wiggled around. It was not a crisp presentation.

The operation -- excuse me. I would say that is more the result that I was talking about there. The operation of the circuit, of course, in the case of the analog circuit, the operation of the analog circuit is totally different from the operation of the digital circuit. They don't work at all the same.

In one case you are measuring a value and using this to compute with, if you will, or gain a result. In another case you are counting pulses most of the time. So, as I say, we have here the means are different and the operations are different.

To a casual observer who is not observing very carefully, some of the results might appear to be similar. But in detail, for example, in the ball bounce, in detail the results are quite different.

Q All right, sir. Do you have any view with respect to whether or not there are any distinctions between TV monitors and TV receivers?

A This is a place where I really think that Professor Ribbens shouldn't have done it, because there are terms that have been in the field for such a long time, since 1950. Every engineer knows the difference. I mean I think that quibbling about a monitor -- a television monitor is something that everybody has known that is in the field. It just doesn't bother to have a front end, if you are going to call it a monitor. And a television receiver, you don't need to call it a broadcast receiver. A television receiver is one that receives television signals.

And I have, I bought from my company a nice 17 incher which did both, but it has a switch on it, and when you switch it one way it's a television receiver, the front end is used, and when you switch the other way you shut off the front end and then you can go directly into the video input, and that one is called a television monitor.

Q All right, sir. Have you undertaken to study certain patents and such which have been indicated to you as

being the prior art in this case?

A Yes, I have.

Q Could you state, sir, what that prior art is which you have studied?

A The most important prior art is the '480 patent.

There is in addition to that the prior art of Space War and Bounce War, which is included within Space War, the RCA pool games, the Michigan pool games.

Prior art is, of course, the 14 patents that are listed by the Patent Office.

And in addition, we have patents that were found by the defendants, namely two patents of Balding, a patent of Hurford.

And also, of course, '507 is prior art to '598.

MR. ANDERSON: Your Honor, I object to that and I move that it be stricken. There is no basis upon which this witness can state that the '507 is prior art to '598.

THE COURT: Well, he is stating an opinion, and I am accepting it as such. Overruled.

BY MR. GOLDENBERG:

Q Mr. Holt, I hand you Defendants' Exhibit 11, which is the prior art of record in the Patent Office, Defendants' Exhibit 9, the prior art patent upon which defendants rely, Defendants'

Exhibit 8, which is documents pertaining to the University of Michigan pool game, Defendants' Exhibit 10, documents pertaining to the Space War computer game, and Defendants' Exhibit 13, documents pertaining to the RCA pool game.

THE COURT: Before we get into those, we will take a 10 minute recess.

MR. GOLDENBERG: All right.

(There was a brief recess taken, after which the following proceedings were had herein:)

MR. GOLDENBERG: Your Honor, during the recess Mr. Anderson and I thought we could, for both parties, offer you -- (tendering document to the Court.)

THE COURT: That was a rather broad hint. Thank you very much.

MR. ANDERSON: You are welcome, your Honor.

THE COURT: I am most appreciative.

BY MR. GOLDENBERG:

Q Mr. Holt, before we recessed we were inquiring about prior art, and you had made reference to the '480 patent, is that correct?

A Yes.

Q Could you state your understanding of the disclosure of that patent, sir?

A The '480 patent disclosed a great -- the disclosure showed a lot of kinds of games that could be played using a

television set, raster scan, and it showed at least -- well, in general, there was some kind of a ball or a symbol that could be moved around. It showed essentially a means for positioning symbols on the screen, and these -- and the controls for these involved something that a player could manipulate.

And it did involve, because it was a raster scan, they used time delay from the synchronizing pulses to position the symbols.

Q Could I ask you, sir, as you give this testimony turn to the '480 patent and the appropriate exhibit book and make reference to whatever portions of the text or drawing you believe support what you are saying. And that is Tab --

A Tab 4 in the blue book.

Q -- Tab 4 in Defendants' Exhibit 9.

A Well, we can simply go through the figures, that's the nicest way, and quickly do that.

Q Would you do that, sir?

A Fig. 1A just simply shows a connection of an antenna, connection to a television set.

Fig. 1 shows a -- presumably a television set, connected to a box with some knobs on it which are the way a player can manipulate symbols.

Fig. 1B shows some -- a different way, with three boxes, three control boxes instead of one.

We go to Fig. 1C on the next page. We see what is presumably a light gun in the shape of a pistol.

Perhaps your Honor didn't get -- it's rather nice, these light guns, and what is happening is that you are pointing the gun with optics at a certain spot in the television set. Meanwhile the raster is going like this (indicating) and finally it passes by the place that the gun is aimed at. If your switch isn't down, it doesn't do anything. But at the time that -- if your switch is down at exactly that time, then the light pulse comes through the optic, hits on the photocell, and then it can tell the game, or, you know, these are used in computers a lot, too, for all kinds of related ways of getting information in and out. It gives a computer like signal to the game, or to a computer.

So it is a real coincidence bearer, and lots of nice things happen that are quite a lot of fun. That's Fig. 1C.

Figure 1D, this I think shows an interesting -- one of the things that made the '480 machinery a little bit more expensive than they would have liked to is they had to have their own source of synchronizing signals, except if you go as shown in 1C you can actually pick up by a different, an easier way, a synchronizing signal from the television itself. That's what shown on 1D.

1E is a different kind of a light gun arrangement. "A crowbar" is another one of the marvelous technical terms, which means that if you wanted to stop this electronic circuit, one way to do it is to get an iron crowbar and put it across the electricity so it just shortcircuits it. That's the way that term is used.

We have in Figure 4 what looks to me like a photocell on the left, that thing with the circle on it, 50, would be a photocell, and this would be a circuit that was used in some of the games with a light gun in it.

C Could you turn to Figure 3?

A Figure 3, yes. Figure 3 is a basic block diagram of one of the kinds of things that '480 was describing. We have a --

THE COURT: Excuse me. Where is Figure 3?

Oh, here it is.

THE WITNESS: It's on the next page, your Honor.

Sheet 4 there.

THE COURT: I have found it. Thank you.

BY THE WITNESS:

A (Continuing) That's a block diagram, and it shows a lot of the things that Mr. Baer wrote down in the disclosure. It shows a horizontal sync generator and a vertical sync generator. And these are necessary if you are going to have a game of which the only connections are to the antenna terminals of the television set, the television receiver.

And we have a dot generator 1 and a dot generator 2. And these presumably -- dot generator 1 I think as it has been described there would be a kind of paddle, and dot generator 2 would be something that is going to be a ball. And then we have a coincidence here.

Q Does the '480 patent actually describe those dot generators as paddles and balls?

A I would have to look and see. I don't know whether it does. I may have misspoken on that.

Q All right, sir. Could you continue?

A Yes. We have a summing circuit in which we are summing the outputs of the dot generators and of

the synchronizing pulses. And these -- this summing amp modulator then is coupled to the RF oscillator. It is actually wired to it. I don't want to get into a discussion about "couple".

And then the RF oscillator goes to the television antenna set.

We also have a box over on the top right. called "Target Circuit" which have various effects on the coincidence. And if you have a color receiver you can also, say, change color perhaps suddenly whenever you get a coincidence.

And a battery power source.

Q Mr. Holt, could you relate Figure 3 to Figure 12A of the '507 patent as represented in Plaintiff's Exhibit 39?

A Well, we see many of the same blocks here. There is an extremely important single difference. We have, as I say, the vertical sync and the horizontal sync, vertical sync being in blue and the horizontal in red there, and they are on this drawing, the vertical sync shown in Figure 3 of '480, vertical sync generator 32. So that's there.

We have the horizontal sync generator, which is in red on the 12A drawing. I believe that 12A drawing is in '507. Yes.

Q Yes.

A That's part of '507. So we are comparing a drawing from '480 to a drawing in '507.

We found two of these blocks there. We have a dot generator number 1 in Figure 3 here, which would be equivalent to the spot generator paddle A.

We have a dot generator number 2 which would be equivalent to the spot 2 generator paddle B. Or I don't know, it might be equivalent to the ball.

In any case, we have three spot generators in the '507 drawing, and only two shown in Figure 3.

There are shown coincidence circuits in both, I believe. Yes, there is a coincidence circuit there. 121.

I am looking for a summing amplifier modulator. Yes, I see that up there.

Q When you say up there --

A Up on the top right is a summer and RF Oscillator in the drawing 12A.

Q That's Plaintiff's Exhibit 89?

A Yes.

Q Do you find a corresponding element in the Figure 3 of the '480 patent?

A Yes. That is block 37.

The RF oscillator 38 is also shown in that upper right-hand block.

Q Could you state then the differences, or difference, as you perceive them or it, between the '507 patent and the '480 patent?

A The only difference is the fact that we have in '507 a hitting spot and a hit spot. That is the difference between the two patents. The rest of the stuff is very much identical. The disclosures are very, very similar.

THE COURT: May I ask a question at this time? In the '480 patent, as you understand it, could the one spot be used as a paddle and the other spot used -- be used as a ball?

THE WITNESS: They were not so described, your Honor.

THE COURT: Well, I know they weren't so described, but could you play, say, a one-man ping-pong game on '480 as described?

THE WITNESS: No, your Honor, you can't do that.

THE COURT: And why wouldn't you be able to do that?

THE WITNESS: Well, in the '480 what you are supposed to do was you could control the position of these spots on here, but the most that has happened as they met was something disappeared.

THE COURT: There was no bounce?

THE WITNESS: No bounce at all. That's correct, your Honor. An important difference. It's the only difference.

THE COURT: All right. Well, that's what you mean when you say there is no hit and hitting spots.

THE WITNESS: That's what I mean, yes.

THE COURT: All right, thank you.

BY MR. GOLDENBERG:

Q Now, sir, in any of the various items that have been made available to you and indicated as prior art in this lawsuit, are there any in which there is bounce past one spot, bouncing off of another spot?

A Yes, sir, there are many. The Michigan pool game had spots bouncing off each other a great deal. The ball, the cue ball, was hitting the rack balls, and they were hitting each other in turn.

They were also bouncing off of what you could call a fixed hitting spot, which would be the edge of the table.

The Space War in its bounce version had --

Q Could you give your understanding of that?

A Well, Space War had a number of options. These again were computer people playing in their off-times, and making games, and they -- one of the versions they had was of where their projectiles that they sent whizzing after the enemy would as a matter of fact bounce off the side.

MR. ANDERSON: Your Honor, I would like to object because I am not certain that this testimony is any more than what is in the record at the present time with respect to Space War,

and I think it's improper for --

THE COURT: Well, Dr. Ribbens testified to his understanding of these games on the basis of what he read in depositions. Has Mr. Holt done the same thing?

MR. GOLDENBERG: Yes, your Honor.

THE COURT: And read the same materials that Dr. Ribbens has read?

MR. GOLDENBERG: May I put the question to him, your Honor?

THE COURT: All right.

BY MR. GOLDENBERG:

Q Have you read any depositions concerned with the game Space War, sir?

A Yes, sir, I have.

Q Have you studied any documents --

Well, let me put it this way, sir. Have you studied the documents which are included in the Space War exhibit binder?

A Yes, I have. Further --

THE COURT: Well, here I think that this testimony is no different in this respect than the testimony given by Dr. Ribbens.

MR. ANDERSON: Your Honor, my objection is really that there are various versions of the

testimony of what Space War was or where it was done, and I think that the witness should say what specific instance he is referring to, not some nebulous general term that may have occurred at any time and in any place.

There is even a book in 1974 that talks about Space War that is not in evidence but was produced and testimony was taken on it during this trial.

THE COURT: Well, let's find out what he is referring to and his understanding of what Space War is.

MR. GOLDENBERG: Yes, your Honor.

BY MR. GOLDENBERG:

Q Mr. Holt, would you state what you are referring to in Space War and your understandings of it? Could you state the basis of those understandings?

A Yes. And, your Honor, I have rather peculiar qualifications for understanding Space War.

THE COURT: Well, I believe that is true, but the question here is whether you really know how it is played and also what particular version you are describing, if there is more than one version. That is what we are trying to get a specific.

BY THE WITNESS:

A (Continuing) Well, I just programmed and designed a game early in 1953 which led me to understand the depositions.

MR. ANDERSON: Your Honor, I would object again, if the witness is talking about what he did with respect to Space War or any other activities.

THE COURT: Yes. You are only allowed -- not because of any deficiency in your background or your testimony but because of certain rules of evidence covering this trial -- you are only allowed to talk about these three games and your understanding of what was actually done in those three games. So what we are trying to find out here is what particular version of Space War are

you talking about and how did you acquire your knowledge of it.

MR. ANDERSON: By that I presume the Court means within this record, how did he acquire his knowledge of it. Because otherwise we are again getting into some --

THE COURT: Oh, if it turns out that this witness was there at that demonstration or something --

MR. ANDERSON: The references in the record are to specific events, and they are relied upon in the defendants' notice pursuant to 5 USC 282 as public knowledge, the video game -- I am reading, "The video game entitled 'Space War' used and known at Massachusetts Institute of Technology as early as about 1961 or 1962 and at Stanford University as early as about 1963."

Now, I believe that any testimony about any other game playing is outside of the notice, and we should have had an opportunity to discover about such a game.

THE COURT: Wasn't Space War in the notice?

MR. GOLDENBERG: Yes, your Honor. Space War is.

THE COURT: Or is that what that refers to?

MR. ANDERSON: That is what that refers to, your Honor. I am sorry.

MR. GOLDENBERG: And the documents that we have

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presented to the Court deal with those two games that Mr. Anderson has just told you.

THE COURT: It is my understanding that this is what this witness is going to testify about, that game or those games that were involved in those demonstrations. Now I am not going to limit his testimony to what he knows happened on some particular date. He can say anything he knows about those games and how they worked.

MR. ANDERSON: Well, your Honor, if he is going to testify about something that happened in Seattle or Miami, I think that is improper. The record only is relying upon events at Stanford University and MIT.

THE COURT: I don't agree with you in that, unless it should turn out that they did something totally different in Seattle than they did in California. I don't think there is any magic by any particular group of people or any particular date. The game doesn't change its spots depending on where it's played.

MR. ANDERSON: Apparently in fact it very much may have, your Honor. That is certainly what the record would show. And I think again we had no opportunity of discovery or cross-examination.

MR. GOLDENBERG: Your Honor, I think --

MR. ANDERSON: One of the witnesses said there were 20 to 50 versions.

MR. GOLDENBERG: Your Honor, this colloquy started when Mr. Holt began to testify about a version of Space War called Bounce Space War, and I think I am right on that. Now, I think there were depositions taken with respect to Bounce Space War. Portions of those depositions are included in the exhibits we have offered in this case. If I understand Mr. Holt, it is on the basis of the study of those documents that he is going to give his testimony

at this time.

MR. ANDERSON: Your Honor, then I would like to object just on the ground of foundation. I think the witness should establish the particular time and place that he is referring to where this alleged Bounce Space War occurred so we can check the records.

THE COURT: Well, whatever deposition is referred to, and I'm sure counsel is aware of what that refers to, I am going to let him testify on the basis of what he read in the deposition.

MR. GOLDENBERG: All right, sir.

THE COURT: So far I have heard nothing really to lead me to believe that one of these computer games is essentially different from another, and therefore, this evidence is really cumulative.

I might be wrong about that. I think that if there is any difference between what they did at the University of Michigan and what they did in Space War, it hasn't filtered through to me yet.

So another basis for overruling your objection is I don't think it's prejudicial in any way.

MR. ANDERSON: Thank you, your Honor.

MR. GOLDENBERG: Thank you, your Honor.

BY THE WITNESS:

A (Continuing) Yes, my knowledge does come from reading of the depositions. And at least one of the people interviewed in the depositions, your Honor, did describe a version called Bounce War or Bounce Space War.

And Space War was a really beautiful thing. Again it was -- but on a cathode ray tube, not a raster scan. And indeed, all of these computer-driven games, they didn't use raster scans. They could have.

And here they had, in Space War they had a central sun, which formed a gravity thing, and they had two contestants who were shooting missiles at each other, and if a missile missed the guy which it was aimed for, in one of the standard versions it would go off the screen on the right and reappear on the left, kind of odd. So some other people said, "Gee, let's put it in so it bounces." And it came in, and the angle of reflection equaled the angle of incidence, just like a mirror, like bouncing off of that.

So Space War and Bounce War certainly did have bouncing off of what people had been calling a fixed hitting spot, which is a wall.

And of course, as I have testified, the Michigan pool did that. In addition to having -- the Michigan had moving hitting spots, too.

The RCA game had a moving hitting spot, as you saw in the movie.

So that all those three are directly prior art. They were all shown to be in the public -- I guess it's public domain. They were certainly published and articles about them were published and lots of people heard about them prior to the invention of '507.

So that when you realize that '480 was available to the inventors of '507, and also hitting spots that were bouncing off of things were available to them from at least these three other games, it's hard for me to see how the '507 could have -- that you can say there was an invention.

BY MR. GOLDENBERG:

Q Why do you say that, sir?

A Well, sir, the only thing that I can put together as new in '507 over '480 -- and '480, to my best opinion, is prior art. The only new thing in there is the fact that you have some kind of a symbol bouncing off of another symbol. And we have three good depositions showing that before that time and published and known to a lot of people were three examples of symbols bouncing off of other symbols.

Q Weren't those previous games played on computers and cathode ray tubes?

A Yes, sir, however, might I explain this?

It is true that those were big, expensive computers in those days. Today they are very, very much smaller. This is still a special purpose computer --

MR. ANDERSON: Your Honor, I object to testimony about what could be done today. The inventions were made in 1967.

THE COURT: Yes, that will be sustained.

BY MR. GOLDENBERG:

Q You understand, sir, that the time frame in which you are dealing would be in the period 1966, 1967?

A Yes, with respect to the raster scan as opposed to the television scan, it was really just optional to whoever hooked up the cathode ray tube for any of these games whether he would use a raster scan or a point to point scan.

In the case of the Michigan pool, I think that the reason they chose the point to point, your Honor, was that the computer as part of it already had a means of changing digital signals to analog signals which the laboratory oscilloscope accepted.

But they could perfectly well have programmed the computer --

MR. ANDERSON: Your Honor, I object to this witness saying what people could have done in the sense that he is testifying now about what somebody else thought or comprehended. I think that is speculation and objectionable.

THE COURT: No, I think it goes to obviousness, and I think he is qualified to state what was obvious back in 1954.

BY MR. GOLDENBERG:

Q You do understand, sir, that in providing the answer that you are presently doing, you have reference to the state of the art in 1954?

A Yes, I do have reference to the state of the art in 1954. That is what I am discussing.

In 1954 --

MR. ANDERSON: Your Honor, I again respect the ruling. I would suggest that testimony about what was obvious is different than testimony about what the people involved at that time could have done.

THE COURT: I understand that distinction, but I don't think that the witness is limited to what was actually done. I think that he is

a competent witness to testify to the facts which bear on the issue of obviousness.

One of the things that seems to me bears on the issue of what was obvious to Baer is what was obvious to persons who were working 20 years before him.

I realize that they are working with different equipment than he was, but that doesn't render the testimony inadmissible.

MR. ANDERSON: Your Honor, I submit that the testimony about what those people were thinking is best evidenced by what they actually did. There is no better evidence.

THE COURT: He is not testifying in this connection about what they were thinking. What he is testifying about is what was the state of knowledge back in 1954.

MR. GOLDENBERG: And, I believe, what was available to them at that time, your Honor.

MR. ANDERSON: Your Honor, I have no objection to testimony, if it is within this record, of what was available to them at that time, but I do object to this witness trying to improve upon the evidence of what they did and saying what they could have done, what these people

could have done.

It is trying to read their minds and understand what they did when the best evidence is what they did and nothing else.

MR. GOLDENBERG: Your Honor, perhaps the problem here is that the witness did open his testimony by saying "What these people could have done."

I don't want to lead the witness, but if the witness were to talk about what was obvious to ordinary people skilled in the art at that time --

THE COURT: That is really all I interpret the testimony anyway.

MR. GOLDENBERG: I thought you did, your Honor.

THE COURT: I don't interpret this as being his testimony of what anybody else was thinking, but rather, as I say, his testimony of what was known at that time and what they could have done had they wanted to.

Certainly they were people of ordinary skill in the art. No question about that.

All right, overruled.

MR. ANDERSON: Thank you, your Honor.

BY THE WITNESS:

A At that time in 1954 television, of course,

had been now five years old and a lot of tests were around. Oscilloscopes were around a lot, and the people at Michigan did have oscilloscopes and everybody reasonably skilled -- in fact, junior engineers, that is the first thing they did.

An oscilloscope can very simply be converted into a raster scan. You just put two sawteeth on it instead of one, which is the normal way an oscilloscope is run, is with one sawtooth time based horizontally, but vertically you plots voltage; but a television set puts sawteeth on both axes so it goes this way (indicating).

So people of ordinary skill in 1954 were always hooking up an oscilloscope for raster scans for various purposes. I did it myself.

MR. ANDERSON: Your Honor, again I object and I move to strike the testimony. There is nothing in this record that says oscilloscopes were being hooked up as raster scans in 1954, and I think this is again trying to interject new evidence of prior art of which we had no notice.

I think the defendants are not entitled to now try to buttress their record by whatever means.

THE COURT: I don't regard this as doing that. I don't think that in providing the notice that is required by Section 282 a party is required to spell out in great detail the significance of what he lists. I think the person who is given that notice is on notice of everything that a person of ordinary skill in the art would know from that particular phenomena. Otherwise, these notices would probably run for pages and pages.

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MR. ANDERSON: Your Honor, this is totally apart from any of these notices. This is testimony of what unknown people, "they", were doing in the way of programming oscilloscopes to generate raster scans.

THE COURT: That is the best way in the world to show what is known, to testify to what people did.

MR. ANDERSON: Your Honor, we can't interrogate those people called "they".

THE COURT: You can interrogate him.

MR. ANDERSON: But he is only reporting what other people did.

THE COURT: You also have witnesses of your own who are certainly competent to rebut this testimony if they disagree with it.

Overruled.

MR. ANDERSON: Thank you, your Honor.

BY MR. GOLDENBERG:

Q Mr. Holt, with respect to this matter of hooking up oscilloscopes and such, are you testifying out of your own personal knowledge of the period 1954?

A Yes, sir.

Q Could you continue, sir, with your answer to the outstanding question?

A In the time frame near and around 1954, I had many occasions to hook up an oscilloscope as a raster scan. Not

only that, engineers below me were doing it as a matter of course.

Q What for?

A Many reasons. We would want to see what an image looked like, for example. We would like to be able to see an X-Y portrait of signals that were coming in.

We often did this for many reasons in order to view and to manipulate and we, indeed, could position these images on this raster scan by adjusting time delays in exactly the same way that the '480 patent finally describes.

Q From your understanding of the state of the art in 1954, did you have any belief as to whether or not the University of Michigan pool game could have been played on a raster scan type of display?

MR. ANDERSON: Your Honor, again I would like to object to this kind of speculation.

THE COURT: Overruled for the same reason.

BY THE WITNESS:

A The program would have been very slightly different. After having generated a full frame -- see, the computer went and calculated all of the collisions for one set of collisions, and then in the way they did it, they just put out the new positions to the cathode ray tube point by point.

Instead of that, a perfectly standard procedure was to sort these positions. In other words, the computer is

good at sorting things by the order in which they should be put on the television set. So the computer would sort these ball positions and put them in a memory and then feed this memory out to the television set, which would then simply, as a function of time, turn on the flashlight at the time given by the next ball position. They were all in order of time that they should be displayed. It was a very straight forward and well known task for the computer, is to sort objects.

That is a very straight forward way that people were doing other similar jobs.

BY MR. GOLDENBERG:

Q The circuits shown in '507 patent are not computer circuits, are they?

A They could be called analog computer circuits, but certainly they are not computer circuits in the way that we think of digital computers today.

Q How did you derive your understanding of the RCA pool game?

A I derived my understanding of that from reading the depositions.

Q Did you see the film in the courtroom the other day?

A I saw the film yesterday.

Q Could you explain what that game showed with respect to one symbol bouncing off of another symbol?

A The game showed many symbols bouncing off each other as they were supposed to represent pool balls. There was a cue ball indicated. The direction that the cue ball was to initially go in was selected by a player with a light pen.

The cue ball then took off and bounced into other balls, which then bounced into other balls themselves and against the cushions and occasionally disappeared into pockets.

Q Was that game played, according to your understanding, on a raster scan or a X-Y line type?

A No, sir, that game was played on a X-Y type of graphics plotter.

I would like to say that there are many types of displays, your Honor, which actually intermix a raster scan and graphics. This is quite within the state of the art to do.

Q You understand, sir, the statement you just made, does that go to this period now at the time of the RCA pool game in 1967?

A I think so. I can't give you a product number on that, but this type of ability is certainly available to accomplish in the laboratory during any period since the cathode ray tube was invented before 1930.

THE COURT: I think since you are about to go into

a new subject matter, Mr. Goldenberg, we will recess now until 2:00 o'clock.

MR. GOLDENBERG: Thank you, your Honor.

(Whereupon the trial of the abcve-entitled cause was recessed until 2:00 p.m. of the same day.)